

## The hidden agenda: how veiled technoutopias shore up the Paris Agreement

Pre-edited version of my summary of the Paris Agreement published in Nature's World View (Dec. 2015):  
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The Paris Agreement is a genuine triumph of international diplomacy and of how the French people brought an often-fractious world together to see beyond national self interest. Moreover, the agreement is testament to how assiduous and painstaking science ultimately defeated the unremitting programme of misinformation by powerful vested interests. It is the Twenty-first century's equivalent to the success of Heliocentrism over the malign and unscientific inquisition.

The international community not only acknowledged the seriousness of climate change, but demonstrated sufficient unanimity to quantitatively define it: to hold *"the increase in ... temperature to well below 2°C ... and to pursue efforts to limit the temperature increase to 1.5°C"*. But, as the time-wearied idiom suggests, *"the devil is in the detail"* – or perhaps more importantly, the lack of it.

So how then can such an unprecedented and momentous Agreement have potentially sown the seeds of its own demise? Likewise, why did some amongst the senior echelons of the climate change community see fit to unleash their rottweilers on those scientists voicing legitimate concern as to the evolving detail of the Agreement?

The deepest challenge to whether the Agreement succeeds or fails, will not come from the incessant sniping of sceptics and luke-warmers or those politicians favouring a literal reading of Genesis over Darwin. Instead, it was set in train many years ago by a cadre of well-meaning scientists, engineers and economists investigating a Plan B. What if the international community fails to recognise that temperatures relate to ongoing cumulative emissions of greenhouse gases, particularly carbon dioxide? What if world leaders remain doggedly committed to a scientifically illiterate focus on 2050 (*"not in my term of office"*)? By then, any 'carbon budget' for even an outside chance of 2°C will have been squandered – and our global experiment will be hurtling towards 4°C or more. Hence the need to develop a Plan B.

Well the answer was simple. If we choose to continue our love affair with oil, coal and gas, loading the atmosphere with evermore carbon dioxide, then at some later date when sense prevails, we'll be forced to attempt sucking our carbon back out of the atmosphere. Whilst a plethora of exotic Dr Strangelove options vie for supremacy to deliver on such a grand project, those with the ear of governments have plumped for BECCS (biomass energy carbon capture and storage) as the most promising *"negative emission technology"*. However these government advisors

(Integrated Assessment Modellers – clever folk developing 'cost-optimised' solutions to 2°C by combining physics with economic and behavioural modelling) no longer see negative emission technologies as a last ditch Plan B – but rather now promote it as central pivot of the one and only Plan.

So what exactly does BECCS entail? Apportioning huge swathes of the planet's landmass to the growing of bio-energy crops (from trees to tall grasses) – which, as they grow, absorb carbon dioxide through photosynthesis. Periodically these crops are harvested; processed for worldwide travel; shipped all around the globe and finally combusted in thermal powerstations. The carbon dioxide is then stripped from the waste gases; compressed (almost to a liquid); pumped through large pipes over potentially very long distances; and finally stored deep underground in various geological formations (from exhausted oil and gas reservoirs through to saline aquifers) for a millennium or so.

The unquestioned reliance on negative emission technologies to deliver on the Paris goals is the greatest threat to the Agreement. Yet BECCS, or even negative emission technologies, received no direct reference throughout the thirty-two-page Paris Agreement. Despite this, the framing of the 2°C and (even more) the 1.5°C, goals, is fundamentally premised on the massive uptake of BECCS sometime in the latter half of the century. Disturbingly, this reliance on BECCS is also the case for most of the temperature estimates (e.g. 2.7°C) ascribed to the national pledges (INDCs) prior to the Paris COP.

The sheer scale of the BECCS assumption underpinning the Agreement is breath taking - decades of ongoing planting and harvesting of energy crops over an area the size of one to three times that of India. At the same time the aviation industry anticipates fuelling its planes with bio-fuel, the shipping industry is seriously considering biomass to power its ships and the chemical sector sees biomass as a potential feedstock. And then there are 9 billion or so human mouths to feed. Surely this critical assumption deserved serious attention within the Agreement?

Relying on the promise of industrial scale negative emission technologies to balance our carbon budget was not the only option available to Paris – at least in relation to 2°C.

With CO<sub>2</sub> emissions in 2015 over 60% higher than at the time of the first IPCC report in 1990, the carbon budget for 1.5°C has been all but eliminated. However, reducing emissions in line with 2°C does remain a viable goal – just. But rather than rely on tenuous post-2050 BECCS, this alternative approach begs immediate and profound political, economic and social questions; questions that undermine a decade of mathematically nebulous green-growth and win-win rhetoric.

Not surprisingly this alluring rhetoric has been embraced by many of those in positions of power; all the more so as it has been promulgated by two influential groups. First, those, typically but not exclusively economists, who work on the premise that physical reality and the laws of thermodynamics are subservient to the ephemeral rules of today's economic paradigm. And second, those vested interests desperate to preserve the status quo, but prepared

to accept an incremental tweak to 'business as usual' as a sop to meaningful action (e.g. the opportunist enthusiasm of 'progressive' oil companies for "oh-so-clean" gas over "dirty & nasty" coal).

But move away from the cosy tenets of contemporary economics and a suite of alternative opportunities for delivering the deep and early reductions in emissions necessary to stay within 2°C budgets come into focus. Demand-side technologies, behaviours and habits all are amenable to significant and rapid change – and guided by stringent policies could drive emissions down in the near-term. Combine this with an understanding that just 10% of the global population are responsible for around 50% of total emissions and the rate and scope of what is possible if we genuinely thought climate change was an important issue becomes evident.

Imagine the Paris 2°C goal was sacrosanct. A 30% reduction in global emissions could be delivered in under a year, simply by constraining the emissions of that 10% responsible for half of all global CO<sub>2</sub> to the level of a typical European. Clearly such a level is far from impoverished, and certainly for 2°C reductions in energy demand would need to go much further and be complemented with a Marshall-style transition to zero-carbon energy supply. Nevertheless, such an early and sizeable reduction is in stark contrast to the Paris Agreement's presumption that 'ambitious mitigation' out to 2030 can only deliver around 2% p.a. (with negative emissions technologies in 2050 compensating for the relative inaction today).

So why was this real opportunity for deep and early mitigation muscled out by the economic bouncers in Paris? No doubt there are many elaborate and nuanced explanations – but the headline reason is simple. In true Orwellian style, the political and economic dogma that has come to pervade all facets of society must not be questioned. For many years having the audacity to suggest that the carbon budgets associated with 2°C *cannot* be reconciled with green growth oratory have been quashed by those eloquent big guns of academia who spend more time in government minister's offices than they do in the laboratory or lecture room. However, as the various drafts of the Paris Agreement were circulated during the negotiations, there was a real sense of unease amongst many scientists present that the almost euphoric atmosphere accompanying the drafts could not be reconciled with their content. Desperate to maintain order the rottweilers and even their influential handlers threatened and briefed against those daring to make informed comment – just look at some of the twitter discussions!

Not surprisingly the vested interests won out – and whilst the headline goals of the Paris Agreement are to be welcomed, the five year review timeframe eliminates any serious chance of maintaining emissions within even carbon budgets for a slim chance of 2°C. Science and careful analysis could have offered so much more – but instead we are left having to pray that speculative negative emission technologies will compensate for our own hubris.

## Two further and key failures of the Paris Agreement.

**Aviation and Shipping:** the final version of the Agreement fails to make any reference to the aviation and shipping sectors, effectively exempting them from having to align their emissions with the 2°C goal. Unfortunately, the emissions from these two privileged sectors are equivalent to those of the UK and Germany combined. Moreover, both aviation and shipping anticipate huge increases in their absolute emissions as the sectors continue to grow – emissions that will only serve to further jeopardise any prospect for bequeathing future generations a stable climate.

**Reparation for the poor:** finally, there's the sum of \$100 billion that the Paris Agreement proposes should be available as annual support (I prefer *reparation*) to poorer nations to assist both their development of low-carbon infrastructure and their adaptation to an increasingly changing climate. Say it quickly and \$100 billion has a resounding ring – but wait a few seconds and the echo diminishes to a cheap and tinny 'ching'. The normally very conservative international monetary fund (IMF) estimates that the global subsidy (direct and indirect) to the fossil fuel industry in 2015 alone will be \$5.3 trillion dollars; fifty three times more than the Paris monies allocated to poorer nations. The UK is a small island nation on the periphery of Europe and with a population of 65 million. Yet it has an economy twenty nine times larger than the monies offered to billions of poorer people to leapfrog our high carbon energy system and adapt to the changing climate we've chosen to impose on them. The clever deception of the wealthier and high emitting nations in Paris, was to focus arguments on the details of the \$100 billion crumb, circumventing any meaningful discussion of the much larger level of reparations necessary for the poorer nations to actually transition towards a low carbon, climate resilient and prosperous future.

## Tentative reflections a fortnight on

Here we are a fortnight or so on from Paris – and the dust has all but settled. Turn on the radio and the BBC is reporting on whether the UK should expand its London airport capacity at Gatwick or Heathrow. No reference to Paris, CO<sub>2</sub> emissions or the plight of millions who will suffer the consequences of such decisions, but will only ever see aircraft streaking across the sky 35000 feet above. Next up, the BBC reports on how the UK's Department of Energy and Climate Change, its Chief Scientific Advisor and the UK's Environment Agency all enthusiastically support the development of indigenous shale gas - and yet all forget to mention that the UK Government has just reneged on its support for carbon capture and storage. Another high-carbon energy source at odds with Paris and 2°C carbon budgets is simply added to UK's portfolio of North Sea oil and gas without even a squirm of unease from those authorities who should know better.

So where are we now? Future techno-utopias, pennies for the poor, more fossil fuels, co-opted NGOs and an expert community all too often silenced by fear of reprisals and reduced funding. It doesn't need to be like this. Forget the vacuous content, it's the wonderful spirit of the Paris Agreement and the French people on which we need to build – and fast! The pursuit of a low-carbon future could do much worse than be guided by the open concepts of *liberté, égalité et fraternité*.